Knowledge behind barriers: IT access as an enabler of Cuban development

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1. Introduction

The Cuban economy after the revolution of 1959 had become virtually paralysed. As most owners and managers of industrial units fled, the operational sustenance of the economy was at risk. Leaders of the Cuban revolution called upon the population to share their knowledge in order to uplift and regenerate a stuttering industrial infrastructure. At this juncture, direct knowledge-based contributions from the majority of the existent workforce led to a wave of knowledge management which came to revive a virtually paralysed economy.

Half a century later new technologies have emerged and the world economy depends largely on the use of computers and the Internet as means to share and reuse knowledge. At the same time, a unique set of circumstances have turned the vast majority of the Cuban workforce into an Internet illiterate population. In such circumstances any call for a second wave of knowledge sharing, application and reuse for the strengthening of the fragile economy of the country is not likely to receive the same response as 50 years ago.

There are, however, reasons to believe that benefits of information technologies (IT) will be embraced by Cubans as they become available. This represents an opportunity for Cuba and the world.

2. Knowledge and IT in Cuba since 1959: a historical background

A period of active changes in all aspects of the Cuban society and its economy followed the revolution led by Fidel Castro in 1959 (US Government, 1998). The commitment and experience of employees were critical to maintaining existing infrastructure productive. Their knowledge became even more important from February 1962, when the US government declared a total trade embargo on Cuba.

A significant change took place when Cuba joined the Soviet-led Council for Economic Mutual Assistance (CMEA) in 1972. The CMEA, made up of the former Warsaw Pact countries and some of their allies, allowed Cubans to enjoy a period of superficial economic growth. Subsidies provided by CMEA allies to the Cuban economy accounted for more than 80% of Cuba's international trade (UN Statistical Yearbook, 2005). In return Cuba specialised in producing agricultural products – mainly sugar and cigars. Such a specialisation in production had a direct effect in the knowledge of the workforce: as solutions and innovation came directly from outside, local experts from fewer areas were needed. The perceived value of local expertise was diminished.

There were however some disciplines where expertise was sought to be developed through different means including new universities courses and the provision of training to individuals in other countries, mainly the Soviet Union and East Germany. These areas included, among others, computer science (Mesher et al, 1992).

During the 1970's and 1980's and with the financial and training support provided by Socialist allies the first steps were made in the development of a local informatics programme. Cuba produced not only graduates of programs in computer science and related disciplines, but also hardware and software. Engineers from different backgrounds working at the newly created Central Institute for Digital Research were able to produce hundreds of computers to be exported to CMEA allies.

The downfall of communism in the Soviet Union and Eastern Europe immersed Cuba into a deep economic crisis from the early 1990s. A complex process of sustenance rather than economic recovery has taken so far two decades. Advantages that had traditionally been offered by sugar, tobacco and coffee industries were gradually transferred to other knowledge-intensive sectors such as biotechnology, health-care, oil production, tourism and even to the IT industry. Software development, this time for Latin American countries and in particular for Venezuela, has become a priority. The shift has been possible – among other reasons, due to high levels of qualification and versatility of a fraction of the Cuban workforce resulting from those programmes that started in the 1970's.

Paradoxically, adding to external limitations imposed by the US trade embargo still in place, development of the new prioritised sectors and sustenance of the Cuban economy have had to deal with local restrictions in terms of access and use of their main resource: knowledge. While a small percentage of the workforce has been aware of technological developments, traditional rules to keep the population as isolated as possible in terms of flows of information and knowledge of foreign sources have continued to be the norm. Professionals from knowledge-intensive industries have often had to ignore what has already been achieved in the rest of the world. Thus, a form of innovation that is tantamount to starting from scratch or re-inventing the wheel has been the norm. Such conditions have hindered most Cuban industries from reaching necessary levels of competitive advantage. Today Cuba seems to be experiencing innovation based on existent knowledge that essentially ensures its sustenance.

Meanwhile, the world has experienced the beginning and evolution of what has been termed as the 'knowledge age'. Intangible assets play an essential role in the knowledge economy, being the collective knowledge of employees and its flows the most important of such factors.

What is the perception of the Cuban workforce, particularly those working for knowledge-intensive industries, about the current situation and its effects in the Cuban economy?

3. Cuba and the knowledge economy

Given the unique setting in which Cubans attempt to use their knowledge to sustain its economy the following question was addressed:

What is the effect of current policies in the productivity of the Cuban workforce?

The question above lies at the intersection of several domains. These include ambits of developing information systems, economics of innovation, Latin American studies, technology transfer to developing countries and knowledge management. Although there is relevant literature on these topics, the question above was addressed through direct interaction with Cuban professionals from knowledge-intensive industries.

The author felt that the design and application of a structured interview would provide useful results. E-mail based interviews were therefore conducted through a questionnaire sent to individual respondents that were personally known to the author. The questionnaire was designed with care so that it was not interpreted by potential respondents as a part of a research driven by political interests, which would have hindered the opportunity of receiving a truthful feedback. Key questions included:

1. How have international developments affected the evolution of the industry that you work for?
2. How can you describe the flows of knowledge between you and members of international networks? How have such flows affected your work?
3. How can you describe your levels of access to the knowledge available in the public domain? To which extent has such knowledge supported local innovations in your field?
4. What is in your opinion the role that information and communication technologies are playing in knowledge dissemination and innovation in your field?
5. How would you relate knowledge sharing and reuse to the highs and lows of the Cuban economy?

During a period of four weeks 25 individual responses from 7 sectors were received in the proportions described in table 1.

Sector	*Number of responses*	*Description*
Higher education	9	All lecturers at University level
Research	8	Lecturers who described themselves as researchers
Information and Communication Technologies	11	2 of these are lecturers who also described themselves as IT workers
Medicine	1	A doctor who works in a hospital in Havana
Librarianship and Information Sciences	1	A professional who works in an academic library
Management	3	Individuals who hold management roles in three different industries
Journalism	2	One of these works for a national newspaper (“*Trabajadores*”)

Table 1. Number of responses received by sector. A total of 25, using exclusive figures, correspond to: 9 lecturers, some of these also holding research and ICT responsibilities, 9 ICT professionals, 1 doctor, 1 librarian, 3 managers and 2 journalists.

All 25 respondents considered themselves as knowledge-intensive employees and acknowledged their need to use on a daily basis knowledge that already exists somewhere else. Meanwhile, 14 of them believed that new knowledge is created as a result of their responsibilities, and 14 recognise that their functions could not be achieved without sharing or broadcasting knowledge.

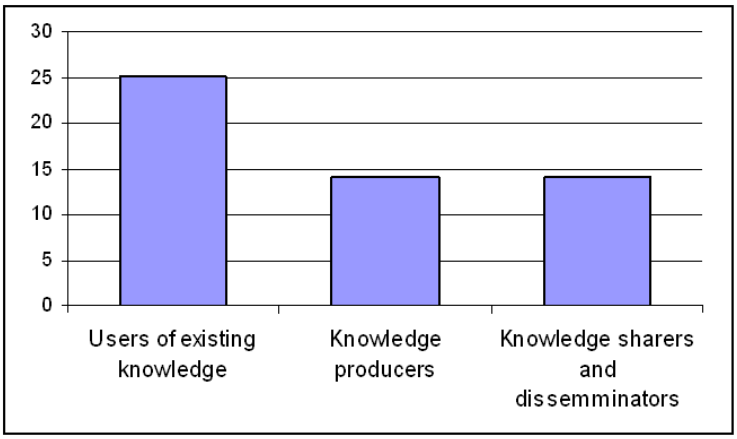

Figure 1. Respondents' relation with knowledge on a daily basis.

Key findings from the field

This section summarises the key input received from the 25 knowledge workers contacted in their attempt to describe the effects of current policies in productivity within the Cuban economy.

a. International developments and evolution of the local industry

21 respondents considered that their sectors have experienced some change due to the influence of international developments. However, respondents described such changes as 'minimal' when compared to the international evolution of their respective industries. Some considered that they themselves had changed their local environment while their sectors were still in the same situation as years ago. Others argued that the only change had been the introduction of computers, with little impact in the development of the sector, as they were doing 'the same, now using computers'.

Meanwhile, three professionals considered that their sectors haven't experienced any change at all in recent years, even when ICT's have been in use for over a decade. One respondent preferred not to answer this question.

b. Knowledge flows and productivity of the workforce

All respondents emphasised the importance of any kind of knowledge flows between professionals from Cuba and other countries. Lecturers highlighted their need to attend international conferences; software developers criticised producing software "from scratch" without interacting with the international community or seeing what has already been done. Journalists drew attention to the lack of not only contact with professionals but also access to any foreign media. As one of the lecturers wrote in English, they only had "*sporadic encounters with journalists from the Communist bloc and left-wing Latin Americans*" in the past, so they have had to "*ignore the most significant developments and trends in international journalism"* and as a result they have *"a rather naïve, simplistic view of journalism in capitalist countries*".

A lecturer wrote:

> "*we still don't have access to many of the most important journals in the field, we rarely send a delegate to world-class conferences, and we have no contact with leading universities and research centers*".

Three respondents admitted they do not know what colleagues in their own workplace working in the same area were doing.

Some respondents ventured to write that there are other reasons that have had a bigger impact in the development of their sectors. The lack of freedom to know what is happening in other countries was emphatically mentioned by 6 professionals as the main problem hindering the flows of knowledge. Such lack of freedom restricts, according to three of them, any sort of interaction with professionals from other countries.

c. Innovation and access to knowledge available in the public domain

There were 8 respondents who argued that it is possible to have some degree of innovation in the current situation. 16 respondents did not agree and 1 respondent provided no answer.

Those who considered that some innovation is possible without access to public knowledge emphasised that in the process they normally "*experience a great waste of time, unnecessary intellectual efforts and a limited vision of the world*".

A statement from one of the respondents summarises the reason why some believe that it is still possible to innovate without knowing what has been already done in the field:

> *"Things are so bad right now in Cuban media that you don't need to read the latest article in Media, Culture and Society or the Columbia Journalism Review to realize what kind of changes is desperately needed in the country"*.

The majority of respondents considered that access to knowledge available in the public domain is essential if some real innovation is to be achieved. To validate such a view, comments outlined the following principles:

- Standards are set by international institutions. Without being able to access such standards no actual innovation can be achieved.
- Even within a local context they are not able to interact with others and therefore they will never accomplish results that require group work and others' experience and knowledge.

A lecturer summarised it as follows:

> "*I can not teach what I can not learn. Students will not be able to do what I haven't taught them. The economy will not be able to achieve what the workforce has not learned*".

One of the respondents was a professional who had been involved in the development of the Cuba's own second generation minicomputers at the Central Institute for Digital Research (ICID) in the 1970's. He argued that "*a lot of effort and resources were put into the design of a Cuban computer as part of a political game*'.

d. The role of ICT in innovation through knowledge dissemination in Cuba

There was consensus in describing IT as a driving force to development and innovation. The total of 25 respondents classified IT as a critical factor in the processes of knowledge creation, storage and dissemination and therefore as tools for development. Some of the terms used to describe their role included '*vital'*, '*basic'*, '*essential'* and '*strictly necessary tools'*. Computers were described as "*a mean to actively participate in the international debate and make a significant contribution in terms of new ideas and projects to the local context*".

Some respondents highlighted that computers in Cuba are not used in a creative way, and argued that they are misused in terms of knowledge production and sharing. Computers in the workplace, they argued store very few information resources and disseminate none.

e. Knowledge sharing and reuse and the evolution of the Cuban economy

All 25 respondents acknowledged that the highs and lows of the Cuban economy are related to access to knowledge. 21 of them mentioned that the lack of access to knowledge is related to the government policies, e.g. restricting access to anything that "*does not bring any political benefits*". This includes not only knowledge that comes from foreign sources, but also knowledge about what has been done in Cuba. At a national level they highlighted the lack of knowledge flows between industry and academia, and even between professionals from the same sector. The fact that it is not the economy but politics which sets the standards and future plans in Cuba was central in most responses.

A response received from a doctor summarises this issue as follows:

> *"People do not access information and knowledge available and this knowledge is not used in Cuba. The result: a permanent low in the economy. Its solution: Freedom".*

4. The future: Challenge or opportunity?

Despite external and internal restrictions, there has been a slow yet steady growth in the acquisition and use of basic information and communication technologies by Cuban nationals in the last five years. Once illegal gadgets, mobile phones are now everywhere notwithstanding its prohibitive costs. This is a result of one of the very few acts bringing any change, passed by Raul Castro since he took over from his brother Fidel in 2006.

Mobile phones and their cameras along with DVDs, hidden satellite dishes and access to Internet illegally provided by system administrators, are slowly breaching the barriers of communication and the isolation imposed by internal and external factors. Dozens of blogs are now maintained by Cuban residents; Cuban news reach international media and even YouTube within the hour; and foreign news, books, films and other sources of information are distributed in flash cards.

There are two key issues to consider in the evaluation of this new context:

- IT does not seem to pose an immediate risk for the current status quo. The government still retains to a large extent control of the IT infrastructure and its contents, while the population remains calm and the country stable in social terms.

- Technology penetration is still weak and contents are not necessarily related to knowledge that could lead to innovation in the workplace.

However, these two factors are likely to change in the medium term. Raul Castro is now 79 years old and the average age of leadership of Cuba's government is well above 70. While there is no clarity in terms of succession, whoever takes over will find it difficult to win the battle against technologies. There is an opportunity for Cuba and the world as the country gets finally reinserted in the global economy.

5. What are the political and economic constraints?

Issues that hinder successful adoption of technologies in the current context in Cuba can be classified as internal or external, depending on where the responsibilities lie.

Internal constraints include:

- Government regulations that preclude the Cuban population from having access to uncontrolled sources of knowledge and also international actors such as Internet service providers from selling their products to Cuban nationals.

- The status of the state-run economy, still recovering from the lost of its Soviet subsidies and having to deal with the impact of devastating hurricanes and other events that usually take back any improvements made.

- Current IT infrastructure. A poor telecommunication system, aggravated by a weak infrastructure in other areas such as electricity, all relevant for IT developments.

The main external constraint is the US trade embargo, as it affects the ability of international providers of technologies and services to sell their products to Cuba. Additionally, IT costs make it difficult for the country to invest in IT infrastructure and related products and services.

6. What needs to be done?

Based on the experience of the last 50 years potential key players in the future of Cuba, inside and outside the country, have accepted that no significant change will take place within the current government. Raul Castro and the board of formerly Army staff running the country today are not prepared to risk their permanence in power. Internet and unrestricted knowledge flows are end-to-end models incompatible with their model of a heavily regulated society and economy. Similarly, generating wealth by encouraging and rewarding individuals' contributions to the economy –a good starting point for further IT developments, are not among their priorities.

However, the scene must be set for the development of a society where individuals have access to technologies, IT-based services and external sources of knowledge. Cuba will benefit from a well thought scenario that fosters its IT development, most certainly financed by the international community. In turn, creative solutions will have to emerge locally to move the economy forward. Ideally, those solutions will reach all sectors of the society, including people with special requirements, for their education in the use of IT while the government is able to promote Internet-based businesses.

Equally important would be any action taken by the US government to relax the embargo to the trade of technologies, as well as any mechanism that would help Cuba meet the cost of IT resources and in particular access to the Internet.

7. Conclusion

The battle of Cuba's government against technology is lost. Cubans are ready for the adoption of IT for development. A Cuban society integrated to the world economy using IT can bring a wealth of opportunities and benefits for local and international businesses from all sectors.

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